Air & Space Traffic Integration

F. Morlang, J. Hampe, S. Kaltenhaeuser, T. Luchkova, J. Jakobi, D.-R. Schmitt

Deutsches Zentrum für Luft- und Raumfahrt e. V., German Aerospace Center

Motivation

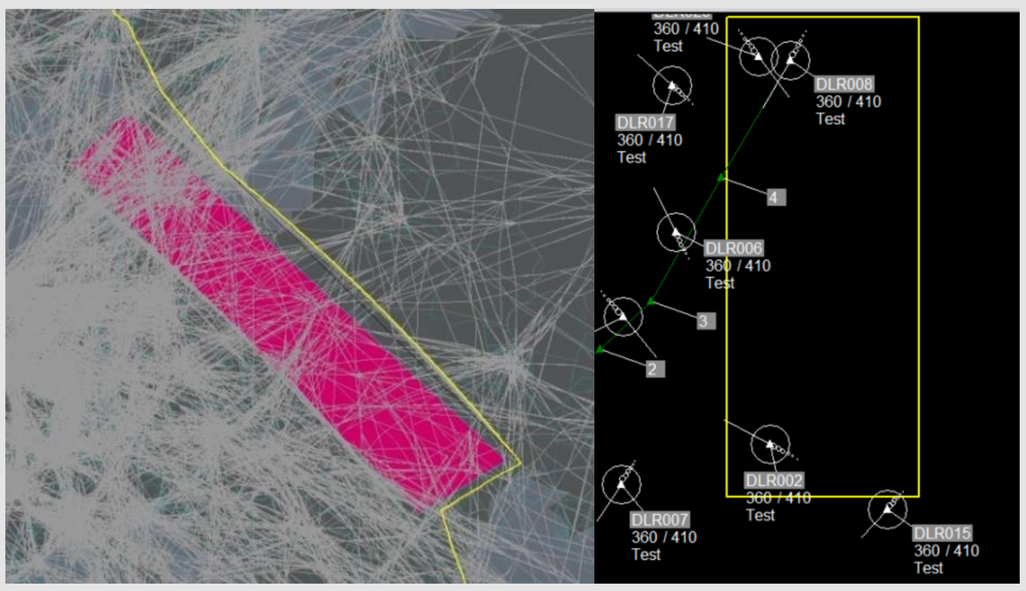
- Commercialization of SpaceTransportation
  - More launch/reentry activities and sites
  - Needed minimum segregation of airspaces in time & size (efficient, economic joint ops)
  - **Goal:** Seamless, efficient, and safe integration of air traffic and spaceflight

Challenges

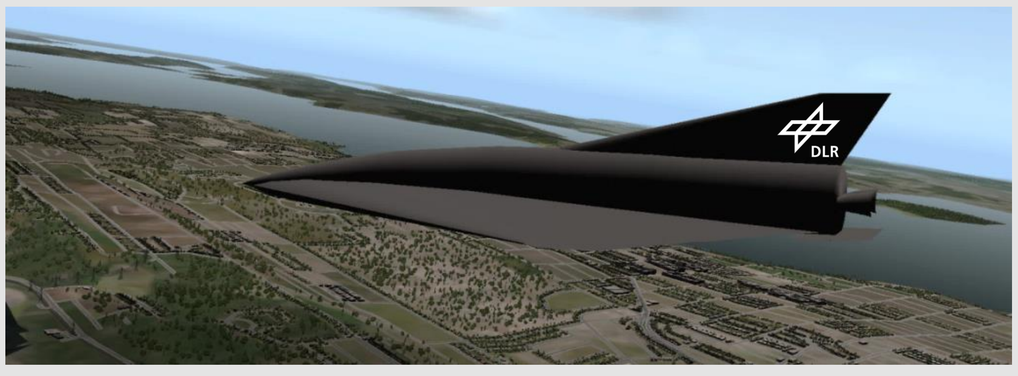
- Launch & Reentry Operations
  - Restricted Airspace for launch/reentry window
  - Airspace in risk of falling debris
  - Airspace Capacity

Approach

- Launch & Reentry Operations
  - Restricted Airspace for launch/reentry window
  - Airspace in risk of falling debris



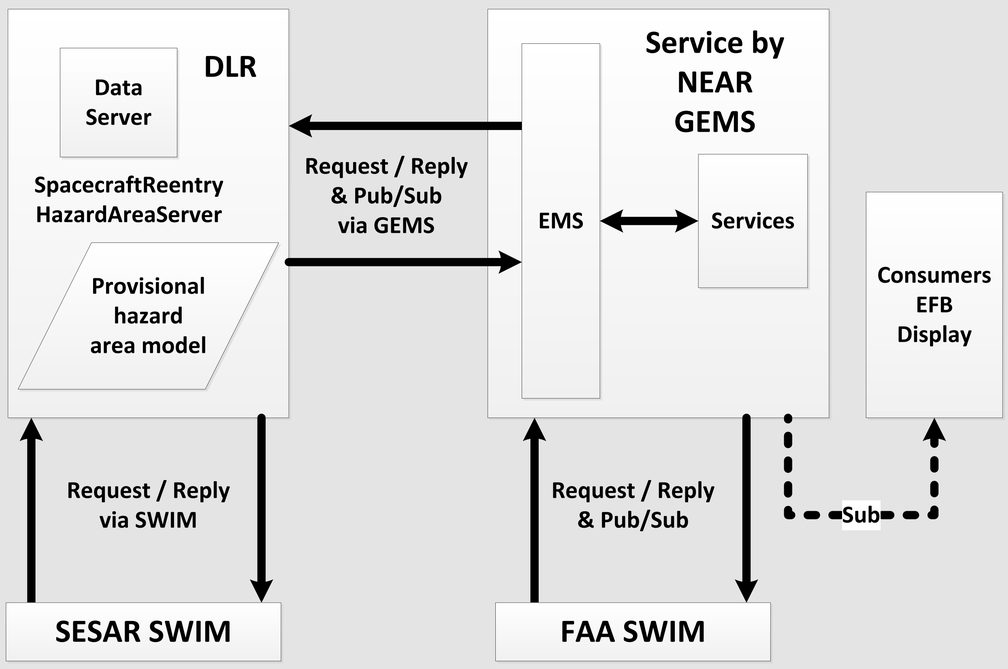
Reentry Hazard area impact on civil aviation routes



DLR SpaceLiner flight simulation model

Approach

- Spaceport/Launch & Landing site evaluation
  - Risk Analysis
  - Impact on aircraft
  - Public Acceptance
- Efficiency of Spaceport Operation
  - International operations and landing
  - Remote Tower Control of Launch/Landing sites
  - Contingency and Continuity Operations



ATM integration concept using a SWIM based Reentry Hazard Area Service 2015

SESAR SWIM Master Class contribution in cooperation with Embry-Riddle Aeronautical University

Remote Tower

Outlook

- Development of a Spacecraft Emergency Information Provider prototype for SWIM integration
- Flight planning/execution testing through simulation
- Flight testing in a human-in-the-loop ATM simulation
- Integration of Spaceflight Operations into ATM

Deutsches Zentrum für Luft- und Raumfahrt

Deutsches Zentrum für Luft- und Raumfahrt e. V. (DLR)
Institut für Flugführung
Lilienthalplatz 7, 38108 Braunschweig, Deutschland
Telefon +49 531 295-2545 | Dirk-Roger.Schmitt@dlr.de